International Multidisciplinary Scientific GeoConference Surveying Geology and Mining Ecology Management, SGEM 2018 vol.18 N4.2, pages 373-380

Cladocera remains in short cores from two small northern lakes (Bolshezemelskaya Tundra, Russia)

Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

© 2018, International Multidisciplinary Scientific Geoconference. All rights reserved. Territories of Bolshezemelskaya tundra are characterized by permafrost and large number of lakes in the region. Harbey lakes are the largest lakes system in the SouthEast of Bolshezemelskaya tundra. The system is a chain of series-connected water bodies (Golovka, Bolshoy Harbey and Maliy Harbey), which are connected by ducts with shallow lakes (Kilometrovoye, Kotovo, Leningradskoye). Short columns of bottom deposits of Kotovo and Kilometrovoye lakes with the lengths of 27 and 16 cm, respectively, were analyzed for the qualitative content of Cladocera. In the subfossil composition of lakes 20 taxa of Cladocera were registered: 17 taxa in Kotovo lake and 15 taxa in Kilometrovoye lake belonging to 4 families (Chydoridae, Eurycercidae, Daphniidae, Bosminidae) and 10 genera. Subdominants of Kotovo lake are represented by Chydorus cf. sphaericus, Alona affinis and Bosmina (Eubosmina) sp. Chydorus cf. sphaericus is the dominant in Kilometrovoye lake throughout the entire period of the study, while in Kotovo lake this taxon becomes the dominant only at the depth of 9 cm by replacing Alona affinis. The increase of the planktonic species proportion in the upper 0-3 cm of the sediments with decreasing of the relative abundance of the littoral zone inhabitants is noted. The proportion of littoral species in the composition of Cladocera remains of the Kotovo and Kilometrovoye lakes is quite high, due to small size and depths of the water object. Increase of the proportion of Chydorus cf. sphaericus at the present stage of the lake evolution indicates the beginning of the water pollution and eutrophication. The increase of the planktonic species proportion can be the consequence of the permafrost melting.

http://dx.doi.org/10.5593/sgem2018/4.2/S19.049

Keywords

Bolshezemelskaya tundra, Cladocera remains, Harbey lakes, Paleoreconstructions

References

[1] Iglovskiy S. A., The anthropogenic transformation of the Russian European North permafrost conditions and its consequences, Electronic scientific journal Arctic and North, 2013, issue. 10, pp. 107-124.

[2] Frolova L., Ibragimova A., Fedorova I., Stratigraphy of Cladocera in a core from A Yamal Peninsula lake (Arctic Russia), International Multidisciplinary Scientific GeoConference, SGEM 2016, Russia, Book 4, Energy and Clean Technologies, Conference Proceedings, vol. II, 2016, pp. 579-587.

[3] Frolova L.A. Cladocera from bottom deposits as an indicator of changes in climate and ecological conditions, IOP Conference Series: Earth and Environmental Science, 2017, vol. 107, issue 1, № 012084. DOI: 10.1088/1755-1315/107/1/012084.

[4] Ibragimova A.G., Frolova L.A., Grekov I.M., Results of subfossil Cladocera (Branchiopoda, Crustacea) analyses from bottom deposits of Lake Antyukh-Lambina (Kola Peninsula, Murmansk region), Research Journal of Pharmaceutical, Biological and Chemical Sciences, 2016, vol. 7, №6, pp. 3201-3206.

[5] Smirnov N. N., Historical ecology of the freshwater zoocenoses, Moscow: Association of scientific publications KMK, 2010, 225 p.

[6] Flössner D., Die Haplopoda und Cladocera (ohne Bosminidae) Mitteleuropas, Leiden: Backhuys Publishers, 2000, 428 p.

[7] Gudavanniy O. A., Conditions for the Vorkuta climate formation. The main elements of climate. Vorkuta is the city in a coal, city of the Arctic. Second revised and supplemented edition, eds. Getzen M. V, Syktyvkar: Komi Republican printing house, 2011, pp. 15-24

[8] Sarmaja-Korjonen K., Kultti S., Solovieva N., Väliranta M., Mid-Holocene palaeoclimatic and palaeohydrological conditions in northeastern European Russia: a multi-proxy study of Lake Vankavad, Journal of Paleolimnology, vol. 30, 2003, pp. 415–426.

[9] Szeroczyńska K., Sarmaja-Korjonen K., Atlas of Subfossil Cladocera from Central and Northern Europe, Friends of the Lower Vistula Society, 2007, 84 pp.

[10] Kotov A. A., Sinev A. Ju., Glagolev S. M., Smirnov N. N. Cladocera in Identification Key of zooplankton and zoobenthos of European Russia freshwater, issue1, Zooplankton. Alekseeva V. R., Calolihina S. Ja., Eds., Moscow: Partnership of scientific publications KMK, 2010, pp. 151-276.

[11] Fryer G. Evolution and adaptive radiation in the Chydoridae (Crustacea, Cladocera): a study in comparative functional morphology and ecology, Philos. Trans. R. Soc. B, 1968, 254, pp. 221-385

[12] Fefilova E. B., Kononova O. N., Dubovskaya O. P., Khokhlova L. G., Modern status of zooplankton in the system of Bolshezemelskaya tundra lakes, Biology of Inland Waters, issue 4, 2012, pp. 44-52.

[13] Nevalainen L. Distribution of benthic microcrustaceans along a water depth gradient in an Austrian Alpine lake – Sedimentary evidence for niche separation, Limnologica, 42, 2012, pp. 65–71

[14] Van Damme K., Dumont H. J. The 'true' genus Alona Baird, 1843 (Crustacea: Cladocera: Anomopoda): position of the A. quadrangularis-group and description of a new species from the Democratic Republic of Congo, Zootaxa 1943, 2008, pp. 1–25 (available at www.mapress.com/zootaxa/)

[15] Francisco D. R. Sousa, Lourdes M. A. Elmoor-Loureiro, Adriana Quadra, André R. Senna First record of Cladocera (Crustacea: Chydoridae) from Parque Nacional do Itatiaia, Southeastern Brazil, Check List, 2014, vol. 10, № 3, pp. 665–668. ISSN 1809-127X (available at www.checklist.org.br)